MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 350b
MSDS Number: 350b
SRM Name: Benzoic Acid (Acidimetric)

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Description: This Standard Reference Material (SRM) consists of highly purified benzoic acid (C_6H_5COOH). It is intended for use in acidimetric standardization, and is supplied in a unit of 30g.

Substance: Benzoic Acid

Other Designations: Benzenecarboxylic acid, phenylcarboxylic acid, benzeneformic acid, phenylformic acid, benzenemethanoic acid, dracylic acid, carboxybenzene, benzoate, flowers of Benjamin, flowers of benzoin, Retarder BA, Retardex, Salvo liquid, Solvo powder, Tenn-Plas, Nipacide

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component:	Benzoic Acid
CAS Number:	0065-85-0
EC Number (EINECS):	200-618-2
Nominal Mass Fraction (%):	100 %
EC Classification:	XN (harmful); not classified in Annex I, Directive 67/548/EEC
EC Risk:	R22 (harmful if swallowed) R37 (irritating to respiratory tract) R38 (irritating to skin) R41 (risk of serious damage to eyes)
EC Safety:	S25 (avoid contact with eyes) S26 (in case of eye contact, rinse immediately and seek medical advice) S39 (wear eye/face protection) S46 (if swallowed, seek medical advice immediately, show container or label)

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0-4): Health = 2 Fire = 1 Reactivity = 0

Major Health Hazards: Severe eye irritation, possible injury

Physical Hazards: Strong oxidizers may produce a vigorous exothermic reaction.

Potential Health Effects

Inhalation:	May irritate respiratory tract; symptoms include coughing, sore throat
Skin Contact:	May cause temporary skin irritation with redness and pain
Eye Contact:	Causes severe eye irritation with redness, pain, watering, itching
Ingestion:	Large dose may cause abdominal pain, sore throat, nausea, allergic response

Medical Conditions Aggravated by Exposure: Pre-existing eye, skin, and respiratory disorders.

Listed as a Carcinogen/ Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

4. FIRST AID MEASURES

Eye Contact: Remove contact lenses (if any). IMMEDIATELY flush eyes with running water (cold or warm) or normal saline for at least 15 minutes, keeping eyelids open and raising lids to remove all chemical. Do not use eye ointment. Seek medical attention at once, and bring the container or label.

Inhalation: Move the person to fresh air. Qualified medical personnel may give oxygen or start CPR if necessary. Seek medical attention if breathing is difficult or if irritation persists.

Skin Contact: Remove contaminated clothing. Wash affected skin thoroughly with running water (cold or warm) and non-abrasive soap. Remember to clean all skin folds and creases. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Ingestion: Contact a poison control center immediately if possible. Unless otherwise instructed, wash out mouth with water and drink several glasses of milk or water. If gastrointestinal upset or other symptoms appear, seek medical attention. If vomiting occurs, keep head down to prevent aspiration.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Very slightly to slightly flammable in presence of open flames and sparks. May form explosive dust-air mixtures.

Extinguishing Media: For a small fire, use dry chemicals, CO_2, water spray or regular foam. For a large fire, use water spray, fog or foam. Cool affected containers with water applied from a distance. DO NOT use water jet, which may scatter spilled material.

Fire Fighting: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Points: Closed cup 121°C (250°F). Open cup (estimated) >93.3°C (200°F)

Autoignition: 570°C (1058°F)

Flammability Limits in Air: N/A

Lower Explosive Limit (LEL): 11 g/m^3

Upper Explosive Limit (UEL): N/A

Flammability Class (OSHA): Not applicable

Products of Combustion: Carbon oxides (CO, CO_2), phenol, and aromatic compounds.

6. Accidental Release Measures

Occupational Release: Isolate the spill area and warn people not to touch the material. Cleanup personnel should wear eye protection, dust mask and gloves.

Small Spill: Use appropriate non-sparking tools to sweep up the spilled solid and place it in a drum or other waste disposal container. Avoid raising dust. Neutralize the residue with a dilute solution of sodium carbonate. Rinse the contaminated surface with water and dispose of water in accordance with local regulations.

Large Spill: Avoid inhalation and contact with skin and eyes. Prevent material from entering sewers, basements, or confined areas. Dike if necessary. Pick up solids using non-sparking tools and put in a sealed container for later disposal. Neutralize the residue with a dilute solution of sodium carbonate. If spill exceeds RQ, notify National Response Center (800-424-8802).

Disposal: Refer to Section 13, "Disposal Considerations."

7. Handling and Storage

Storage: Store in tightly closed original container in a cool, dry, well-ventilated area away from sources of ignition. Protect from moisture and light. Store and handle in accordance with all current regulations and standards. Although this product is stable, it should be separated from incompatible materials with which it may react slightly (oxidizing and reducing agents and alkalis).

Safe Handling Precautions: Wear eye protection (see Section 8) and avoid contact or inhalation.

8. Exposure Controls and Personal Protection

Exposure Limits: None established.

Ventilation: A good general ventilation system should be sufficient to control airborne levels. If user operations generate dust, fume, or mist, use ventilation to minimize exposure.

Respirator: If necessary, refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

Eye Protection: Splash-proof and dust-resistant safety goggles. The employer should provide an emergency eye wash fountain in the immediate work area.

Personal Protection: Lab coat (or equivalent) and disposable vinyl gloves if skin contact is anticipated. If extensive skin contact is unavoidable, wear impervious protective clothing.

9. Physical and Chemical Properties

Component: Benzoic Acid

Appearance and Odor: Colorless to white solid (crystals, powder, platelets, or scales) with a faint, pleasant, slightly aromatic odor described as similar to that of benzaldehyde.

Relative Molecular Weight: 122.12

Molecular Formula: C_6H_5COOH

Density (g/cm^3): 1.321

Solvent Solubility: Soluble in alcohol, ether, benzene, chloroform, acetone, carbon disulfide, oil of turpentine, carbon tetrachloride, fixed and volatile oils; slightly soluble in petroleum ether, hexane.

Water Solubility (g/L): 2.9 @ 20°C (68°F); 68.0 @ 95°C (203°F)

Boiling Point (°C): 249.2 **(**480.6°F) @ 101.325 kPa (1 atm)

Melting Point (°C): 122.4 (252.3°F); begins to sublime at approximately 100°C (212°F).

Vapor Pressure (at 96°C, Pa): 133.32 (1.0 torr)

Vapor Density (Air = 1): 4.2

Critical Solution Temperature: 117.2°C (243°F)

pH: 2.8 (saturated solution @ 25°C)

10. STABILITY AND REACTIVITY

Stability: X Stable _____ Unstable

Stable at normal temperature and pressure.

Conditions to Avoid: Dust/air mixtures exposed to heat or flame; vapor from molten benzoic acid; incompatibles.

Incompatible Materials: Strong oxidizers may produce a vigorous exothermic reaction. A water solution of benzoic acid may react with metals to generate hydrogen gas.

Fire/Explosion Information: Very slightly to slightly flammable in presence of open flames and sparks. May form explosive dust-air mixtures.

Hazardous Decomposition: Thermal decomposition or combustion produces carbon oxides (CO, CO_2), phenol, and aromatic compounds.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data:

Human, skin: TD_{Lo} = 6 mg/kg or 22 mg for 3 days (moderate irritation).
Human, oral: LD_{Lo} = 500 mg/kg
Rat, oral: LD_{50} = 2530 mg/kg
Rabbit, eye: 100 mg (severe irritation)

Target Organ(s): Eyes, skin, and upper respiratory tract.

Mutagen/Teratogen: Benzoic acid has been associated with birth defects in hamsters, but not in rats or mice. No genetic changes were reported in standard tests using yeast, bacteria, animal or human cells.

Health Effects: See Section 3.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

96-hr LC_{50} bluegill sunfish: 44.6 mg/L, slightly toxic
96-hr LC_{50} rainbow trout: 47.3 mg/L, slightly toxic
48-hr LC_{50} *Daphnia magna*: >100 mg/L, practically non-toxic

Environmental Summary: Benzoic acid may leach into groundwater due to its low soil adsorption. It is biodegradable under aerobic conditions by bacteria present in soil or crude municipal waste (half-life 1 to 10 days), and is also believed to be biodegradable in water. Bioconcentration is considerable in daphnia and snails, but not in fish or algae. When released into air, this material is subject to removal by wet deposition and gravitational settling.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of container and unused contents in accordance with all applicable federal, state, and local regulations. Although this material is not a listed RCRA hazardous waste, it may exhibit one or more characteristics of a hazardous waste and thus requires appropriate analysis to determine specific disposal requirements. Processing, use, or contamination of this product may change the waste management options.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated.

Canadian Transportation (TDG): Not regulated.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): RQ 5000 lbs.

SARA Title III Section 302: Not regulated.

SARA Title III Section 304: Not regulated.

SARA Title III Section 313: Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	Yes
CHRONIC:	No
FIRE:	No
REACTIVE:	No
SUDDEN RELEASE:	No

STATE REGULATIONS

California Proposition 65: Not regulated

CANADIAN REGULATIONS

WHMIS Classification: D2B, Toxic Material Causing Other Toxic Effects (eye irritation in animals)

WHMIS Ingredient Disclosure List: Item Number 160, concentration disclosure threshold 1%

CEPA Domestic Substances List (DSL): CASRN 65-85-0

EUROPEAN REGULATIONS

EU/EC Classification: XN (harmful); not classified in Annex I, Directive 67/548/EEC; not on a priority list.

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Listed on inventory.

TSCA 12(b), Export Notification: Not listed.

16. OTHER INFORMATION

Sources:

Merck Index, 11th Edition, 1989

Nair B, Final report on the safety assessment of Benzyl Alcohol, Benzoic Acid, and Sodium Benzoate. *International Journal of Toxicology* 2001;20 Suppl 3:23-50.

Nethercott JR et al., Airborne contact urticaria due to sodium benzoate in a pharmaceutical manufacturing plant. *Journal of Occupational Medicine* 1984 Oct; 26(10):734-6.

U.S. National Institute of Standards and Technology, Certificate of Analysis: Standard Reference Material® 350b, Benzoic Acid (Acidimetric). 19 July 2005.